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versity, may serve to illustrate the importance and the fruitfulness of the methods of microscopic physiology.

Starting from the well-known facts of gland histology and physiology where it has been now for long known that activity and rest produce corresponding visible changes in their contents, etc., the authors sought to ascertain whether some discoverable change in the active (or worked) nerve cell could not also be distinguished.

Hodge reports as a result, that a marked shrinkage of the nucleus occurs in worked nerve cells over those not worked; a shrinkage amounting sometimes to 33 per cent. In brief:—

“1. The nucleus and cell body both decrease in size as a result of stimulation.

“2. The protoplasm of the cell becomes vacuolated as a result of stimulation.

“3. Differences appear in staining.”

SCIENTIFIC NEWS.

—Professor A. H. Tuttle, of the Ohio State University, has been elected to the chair of Biology and Agriculture in the University of Virginia.

—Professor Herman L. Fairchild, of New York city, has been elected Professor of Natural History in Rochester University.

—Otto Burbach, known through his investigations of the Foraminifera of Lias, died at Gotha, April 22, 1888.

—Dr. Richard Blochmann has been elected ordinary Professor of Zoology in the University of Königsberg.

—Mr. F. H. Herrick, who has been for several years pursuing post-graduate studies at the Johns Hopkins University, has been elected Professor of Biology at Adelbert College, Cleveland, Ohio.

—The work of the U. S. Fish Commission at Wood's Holl this summer is confined almost exclusively to affording facilities for students to investigate the life-histories of marine animals. The laboratory is under the immediate charge of Dr. John A. Ryder, while among those working there may be mentioned professors and students from Harvard, Johns Hopkins, Princeton, and two Ohio colleges.

—James Stevenson, of the United States Geological Survey, died July 25th. Mr. Stevenson was born in Maysville, Ky. He was the business manager in the field of the U. S. Geological Survey under Dr. F. V. Hayden during its existence, and contributed greatly to the efficiency of its work. He was also a very important agent in securing from Congress the appropriations necessary to its success. His large acquaintance in Congress was always most valuable to the scientific enterprises of the Government departments. He is one of the few persons who ascended the great Teton. He was especially interested in American Ethnology, and made extensive collections in that department. The Report of the Secretary of the Smithsonian Institution for 1881 contains an important report by him. He was also a zoologist of considerable attainments.

—Silas Stearns was born in Bath, Maine, May 13, 1859, and died in Asheville, N. C., August 2, 1888. His early education was received in the schools of Bath.

In 1878 Mr. Stearns visited the Smithsonian Institution, where, by his thorough and exact knowledge of the habits of the fishes of the Gulf, and of their economic value, he attracted the special attention of Professor Baird, Mr. Goode, Mr. Bean and others interested in the study of fishes. Mr. Stearns was strongly attracted towards a naturalist's life. His ambition, however, met with discouragement in the absurd statement made by some one in Washington to the effect that no successful work in science would be possible without a classical education.

In 1880 he was made a special agent of the U. S. Fish Commission and the U. S. Census Bureau, in charge of investigations of the marine industries of the Gulf of Mexico. Few pieces of work have been performed with more accuracy and fidelity than his report to the Census Bureau.

An intimate friend says of him: "To my mind his most striking characteristic was patient persistence. No trouble was too great, no time too long, no discomfort too annoying to deter him from the present accomplishment of any task to which he addressed himself."

Few men engaged in business pursuits have been of such substantial aid to science as Silas Stearns, and few have had so many warm and devoted friends among scientific men.—*D. S. Jordan.*

—Seth Green, the famous pisciculturist and Superintendent of the New York State Fishery Commission, died at his home here at one o'clock August 20th, after a long and painful illness. He was born at Rochester, New York, on the 19th of March, 1817. He began fishing as a business when eighteen years of age. He confined himself principally to the waters of Lakes Ontario and Mich-

igan, and availed himself of all the devices then known for catching fish for market. In 1864 he purchased a portion of Caledonia Creek, and began his remarkable system of artificial propagation. This event in his life, so important to all lovers of fish, both for sport and table, has an interest which is intensified by Mr. Green's own modest account:—

“I first conceived the idea of fish-hatching in 1837 while fishing for brook trout in a stream that was frequented by salmon in Canada. I observed some salmon at work making their nests preparatory to casting their spawn. I watched their operations for two days, and then and there made up my mind that I would hatch fish artificially, and would at some future day attempt it. At this time I had never heard of fish being hatched artificially. I kept the idea constantly before my mind, and took advantage of every opportunity to learn something in regard to it. I did not put my ideas into practice until the year 1864, and as brook trout offered the best inducements, I commenced my operations with them, in which I was very successful, making many heretofore unknown improvements and discoveries in fish culture, one of the most prominent being the discovery of the dry method of impregnation of spawn, which I made the first month I was in the business after the spawning season commenced. In the year 1867 the New England Fish Commission, hearing of my success, came to me and prevailed upon me to go to the Connecticut river and attempt the artificial propagation of shad. Many had tried before and failed. After many vexations and trials, among which was the disbelief and scepticism of the fishermen, with which I had to contend, they believing that I was insane, and treating me as such, and after the failure of numerous experiments, I at last hit upon a plan which has proved a great success, and is now, and will continue to be, the means of replenishing our shad rivers equal to the best they have ever been known.”

A Fishery Commission was appointed in New York State in 1868, and Mr. Green was made one of the three Commissioners. Two years afterwards he resigned his position and became Superintendent of the Commission, which owns a hatchery at Caledonia and another at Cold Spring Harbor. The sole ambition of his life, as he himself expressed it, was to make good fish abundant. This in a certain measure he succeeded in doing, and he was everywhere regarded as a benefactor to the poor, the rich, and especially to the sportsman.

—Close to the U.S. Fish Commission station at Wood's Holl, Mass., is the new building of the Marine Biological Laboratory, which was

opened July 10th, as already noticed in these pages. The building is a large but plain two-story structure, noticeable for the number and size of the windows. The ground floor is devoted to elementary zoological instruction. In one corner a small room, partitioned off from the rest, affords a study for the instructor, Mr. B. H. Van Vleck, while all of the rest of the space is occupied by students' tables, aquaria, etc. The upper floor, the arrangement of which is essentially the same, is devoted to investigators, and is under the charge of Dr. C. O. Whitman, who is the director of the laboratory. Various circumstances rendered it impossible to send out the circulars for the laboratory until so late a date that but few could avail themselves of its facilities. There are the present season about a dozen students, equally divided between the two rooms. Notwithstanding the haste with which the building was gotten ready for occupancy it has a fair equipment of all necessary reagents and apparatus. Flowing fresh and salt water are furnished from the pumps of the Fish Commission, but the iron pipes which carry the latter will have to be replaced with some other material on account of rust. The directors have solved the problem of board by opening a boarding house in a cottage (the use of which is given the laboratory by Mr. Fay) where good table board is furnished for \$5.00 per week. The property of the laboratory now amounts to nearly \$10,000, but it needs several thousand dollars more before it can be placed in the position it ought to occupy.

PALANOC, ISLAND OF MASBATE, PHILIPPINES,

April 29th, 1888.

EDITORS OF THE AMERICAN NATURALIST:—I herewith forward you a third instalment of narrative of our trip to the Philippines, which I shall be glad to have published in the AMERICAN NATURALIST, if you think best. We have now been in the islands eight months, and have three remaining; have visited and made representative collections on eleven of the larger islands of the group, and have four still remaining to visit. We have made large collections in most branches of animal life, and have much which from the data we have in hand appears to be new. We shall be able to make a very good comparative study of the islands from our collection. We are already able to say that the islands can be divided into at least five very distinct areas—that of the west including Paraqua and Balabac; that of the south including Mindanao and Basilan; that of the centre including the the large islands of Panay, Negrus, Cebu and Bohol; that of the west including Samar and Leite, and that of the north of Luzon and adjacent islands. Whether the great island of Min-

doro stands by itself we have yet to discover. Each of these divisions has its own peculiar species of such test families as the hornbills, woodpeckers, tailor-birds, sun-birds, pittas, and kingfishers, and in many cases several peculiar species of each.

Yours truly,

J. B. STEERE.

—EDITORS NATURALIST:—Not long since I passed a day at Ward and Howell's Natural History establishment at Rochester, and I was so much interested and surprised, that I have thought that some of the readers of the NATURALIST would be glad to know more of this, the most extensive establishment of its kind in the world. I had bought several thousand dollars worth of specimens of various kinds from Ward and Howell in fitting up the museum of the School of Mines and I had found it a great help to be able to obtain at a fair price authentic, reliable material needed to illustrate lectures upon geology and natural history, and not to be procured through any other channel. But until I stopped at Rochester and went through the establishment, I had no conception of the great variety and excellence of the material available for science teaching that was here accessible with the growing interest in scientific studies, and the increasing appreciation of the value of object teaching, that man is a public benefactor who will supply to us at a reasonable cost, all things necessary to illustrate lessons and lectures. This, Ward and Howell can do to a greater degree than any one person, firm or company in the world. This statement may be regarded as an exaggeration, but after considerable experience with the dealers in natural history material abroad, I do not hesitate to repeat it with emphasis. Professor Ward is himself an educated, scientific man, well up in geology, mineralogy and zoology; he also has a passion for adventure and collecting, which has carried him more nearly "all over the world" than any one else of whom I have known or heard. After his stock of the more common things was large enough, he gave himself up for years to the search of rarities. For example, some years since an interest was excited in the structure of *Hatteria*, and many biologists desired to study its pineal eye and other matters connected with its anatomy, but none were to be had; so Professor Ward, as he has often done, organized an expedition to find and obtain the desideratum. In this case it was necessary to search for long distances along the coast of New Zealand before the haunt of this peculiar lizard was reached, and a sufficient number was captured to supply the wants of the museums of Europe and America.

He and his assistants have scoured India, Borneo, Africa and South America for rarities and always with a degree of thoroughness and intelligence that secured success. Recently, when a good

skeleton and skin of the dugong was needed for the Melbourne Museum, it was found more convenient to get it from Professor Ward than to depend upon the efforts of Australian hunters or naturalists.

Ward and Howell have been now for years occupied in efforts to secure the best representatives of all departments of zoology, and in some instances have undertaken to do what no other dealers in scientific material have the resources and intelligence to attempt, namely, the fitting up of complete museums like that presented by Mr. Brooks to the University of Virginia, and the systematic series of Mammalia gathered for the Museum of Comparative Zoology at Cambridge, and the collection of monkeys presented to the American Museum of Natural History by Mr. Jessup.

Professor Ward's interest in his business and his enthusiasm has always outrun his judgment, until he finds himself with a mass of scientific material in quality, quantity and variety beyond the paying demand. No museum in this country has anything like such a display of interesting specimens in all departments of natural science as Ward and Howell have, while the quantity stored in cellars, tanks, store houses, is much greater. It is in fact a liberal education in natural history to go carefully through their establishment.

This includes, first, rooms devoted to minerals, gems and ores, objects with which Professor Ward began, and which have always held a warm place in his heart. Here the display is very fine, finer indeed than in any public or private collection on this side of the Atlantic. Second, the building devoted to geology containing rocks and fossils from various parts of the world. Third, the department of vertebrate zoology, in which are to be found some living animals of special interest but many more in pickle, skeletonized or stuffed. Fourth, the department of invertebrate zoology, which includes a splendid collection of shells, and a collection of sponges exceeding in volume and interest any other known to me. Fifth, the botanical department, which includes the herbarium of the famous Dr. Harvey.

Among the living animals I was especially interested in a group of about two dozen individuals of *Heloderma* (The "Gila monster") which Professor Ward has had under observation and from which he has learned much that is new in reference to their habits.

In the preceding paragraphs I have spoken simply of Professor Ward or of Ward and Howell, it is but just, however, to Mr. E. E. Howell, to say that he is much more than a mere name in the establishment. He is a trained geologist and was for a long time connected with the United States Geological Survey. Naturally, he presides over the departments of geology and mineralogy; his special interest which is also shared by Professor Ward is meteor-

ites, and it has led them to make extraordinary efforts to gather these interesting objects. Efforts which have resulted in by far the finest collection in this country.

To those who know little of Ward and Howell they may seem mere traders, and this letter, a puff of a business house, but they are much more than traders, they are co-laborers in the work of scientific education whose assistance many a teacher has recognized with gratitude; and this letter is an unsolicited appeal to all those interested in the natural sciences to visit an establishment where so much may be learned at so little cost; and to call attention to the vast amount of indispensable material for the museum, the lecture room and the laboratory which Ward and Howell have brought within easy reach and much of which, without their efforts would have been entirely unattainable.

Yours truly,

J. S. NEWBERRY.

—In the *AMERICAN NATURALIST* for June, 1888, vol xxii., page 537, appeared an article on "The relative weight of the brain to the body in birds," by Dr. Joseph L. Hancock, which it seems, by an oversight of the publishers, failed to bear his name, making it necessary to call attention to the omission.